Database Setup for IM and Presence Service on Cisco Unified Communications Manager, Release 11.5(1)

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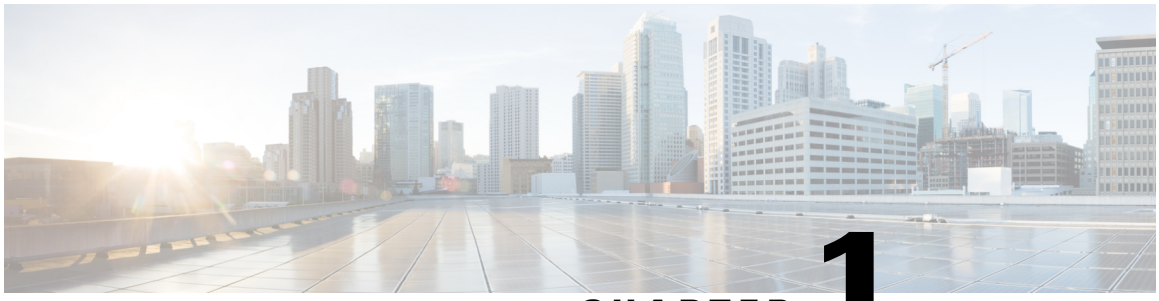


CHAPTER 1

External Database Installation and Setup

This chapter provides information about how to configure an external database to store information from Cisco Unified Communications Manager IM and Presence Service features. The following IM and Presence Service features require an external database:

- Persistent Group Chat
- Message Archiver (IM Compliance)
- Managed File Transfer

- External Database Setup Requirements, page 1
- Additional Documentation, page 3
- External Database Setup Prerequisites, page 3
- Hardware and Performance Recommendations, page 4
- About Security Recommendations, page 4

External Database Setup Requirements

General Requirements

Cisco suggests having a certified PostgreSQL, Oracle or Microsoft SQL Server administrator maintain and retrieve information from the external database.

Hardware Requirements

A remote server on which you install the PostgreSQL, Oracle, or Microsoft SQL database.

Software Requirements

- IM and Presence Service, current release
- External Database:

Database	Supported Versions
PostgreSQL	Many versions 8.3.x through 9.4.1 have been tested. Since the IM and Presence Service features are using common PostgreSQL features, all PostgreSQL 8.3.x – 9.x are supported.
Oracle	Several Oracle versions have been tested. These include 9g, 10g, 11g, and 12c. Since the IM and Presence features are using very common Oracle features such as basic SQL statements, Stored Procedures and basic indexing; we expect that future versions will remain compatible and will be supported. Cisco plans to include compatibility testing of newer major Oracle DB releases during future major IM and Presence releases.
Microsoft SQL Server	Testing has been performed using MS SQL 2012 SP3 and 2014 SP1 versions. The IM and Presence features use common MS SQL features and it is expected that future releases and patches will remain compatible. IM and Presence Service Release 11.5(1) SU1 and later is required to support MS SQL.

- You can install an Oracle or Postrgres database on a Linux operating system or Microsoft SQL Server on a Windows operating system. See the relevant database documentation for details on the supported operating systems and platform requirements.
- IPv4 and IPv6 are supported by IM and Presence connections to external databases.

External Database Requirements for IM and Presence Service

The external database requirements differ depending on the features you want to deploy on IM and Presence Service.

Feature	Requirements
Persistent Group Chat feature	You require one unique logical external database instance for each IM and Presence Service node or redundancy group in an IM and Presence Service cluster. While each node requires one unique logical external database instance with its own set of database tables, these instances can be created on the same remote server database installation.
High Availability for Persistent Chat feature	You must enable High Availability and Persistent Chat. Make sure that both presence redundancy group nodes are assigned to the same unique logical external database instance. Oracle and PostgreSQL can be used with High Availability for Persistent Chat. However, PostgreSQL has some significant challenges it trying to make it a High Availability database with automatic redundancy.

Feature	Requirements
Message Archiver (compliance) feature	We highly recommend that you configure at least one external database for each IM and Presence Service cluster; however you may require more than one external database for a cluster depending on your database server capacity.
Managed File Transfer feature	You require one unique logical external database instance for each IM and Presence Service node in an IM and Presence Service cluster. **Note** Database table space can be shared across multiple nodes or clusters provided capacity and performance isn't overloaded.

Note If you deploy any combination of the persistent group chat, message archiver (compliance), and managed file transfer features on an IM and Presence Service node, you can assign the same unique logical external database instance to each feature.

Additional Documentation

This procedure only describes how to configure the external database on the IM and Presence Service. It does not describe how to fully configure the features that require an external database. See the documentation specific to the feature you are deploying for the complete configuration:

- For information on configuring the message archiver (compliance) feature on the IM and Presence Service, see *Instant Messaging Compliance for IM and Presence Service on Cisco Unified Communications Manager.*
- For information on configuring the persistent group chat feature on the IM and Presence Service, see *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager.*
- For information on configuring the managed file transfer feature on the IM and Presence Service, see *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager.*

External Database Setup Prerequisites

Before you install and configure the external database on the IM and Presence Service, perform the following tasks:

- Install the IM and Presence Service nodes as described in *Installing Cisco Unified Communications Manager*.
- Configure the IM and Presence Service nodes as described in *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager*.

Caution If the IM and Presence Service connects to an external database server using IPv6, ensure that the enterprise parameter is configured for IPv6 and that Eth0 is set for IPv6 on each node in the deployment; otherwise, the connection to the external database server fails. The message archiver and Cisco XCP Text Conference Manager will be unable to connect to the external database and will fail. For information about configuring IPv6 on the IM and Presence Service, see *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager*.

Hardware and Performance Recommendations

When you configure an external database with the IM and Presence Service, you need to consider the following recommendations:

- We recommend that you use similar hardware for both the external database and the IM and Presence Service nodes.
- We recommend that you maintain the external database according to the best practice guidelines described in the product documentation. If you do not properly maintain the external database, and you allow the external database to fill up, this causes performance problems in the IM and Presence Service cluster.

Note To minimize delay and any negative performance impacts, locate the external database server as close as possible to the IM and Presence Service Database Publisher node.

Note If user login performance is very slow or if logins are hanging, review the database performance information for that server.

Related Topics

PostgreSQL documentation
Oracle documentation
Microsoft Server documentation

About Security Recommendations

External Database Connection Security

The IM and Presence Service provides a secure TLS/SSL connection to the external database but only when Oracle or Microsoft SQL Server is chosen as the database type. We recommend that you consider this security limitation when you plan your IM and Presence Service deployment, and consider the security recommendations we provide in this topic.

Maximum Limit Connection Setup

For additional security, you can limit the maximum number of permitted connections to the external database. Use the guideline we provide here to calculate the number of database connections that are appropriate for your deployment. This section is optional configuration. The guideline infers that:

- You are running the managed file transfer, message archiver (compliance), and persistent group chat features on the IM and Presence Service.
- You configure the default number of connections to the database for the persistent group chat feature on the **Cisco Unified CM IM and Presence Administration** interface.

Guideline

PostgreSQL — max_connections = (N ×15) + Additional Connections

Oracle — QUEUESIZE = (N ×15) + Additional Connections

Microsoft SQL Server — the maximum number of concurrent connections = (N x15) + Additional Connections

- N is the number of nodes in your IM and Presence Service cluster.
- 15 is the default number of connections to the database on the IM and Presence Service, that is, five connections each for the managed file transfer, message archiver, and persistent group chat features.
- Additional Connections represents any independent administration or database administrator (DBA) connections to the database server.

PostgreSQL

To limit the number of PostgreSQL database connections, configure the `max_connections` value in the `postgresql.conf file` located in the *`install_dir`*`/data` directory. We recommend that you set the value of the `max_connections` parameter equal to, or slightly larger than, the above guideline.

For example, if you have an IM and Presence Service cluster containing six nodes, and you require an additional three DBA connections, using the guideline above, you set the max_connections value to 93.

Oracle

To limit the number of Oracle database connections, configure the QUEUESIZE parameter in the listener.ora file located in the *`install_dir`*`/data` directory. We recommend that you set the value of the QUEUESIZE parameter equal to the above guideline.

For example, if you have an IM and Presence Service cluster containing 4 nodes, and you require one additional DBA connection, using the guideline above, you set the QUEUESIZE value to 61.

Microsoft SQL Server

To limit the number of MS SQL Server database simultaneous connections carry out the steps below. We recommend that you set the size of the queue equal to the above guideline.

1. From the **SQL Server Configuration Manager**, right-click the node you want to configure and click **Properties**.
2. Click **Connections**.

3 In the **Connections** pane, enter a value from 0 to 32767 in the **Max number of concurrent connections** dialog box.

4 Restart the Microsoft SQL Server.

Default Listener Port Setup

Note This section is an optional configuration.

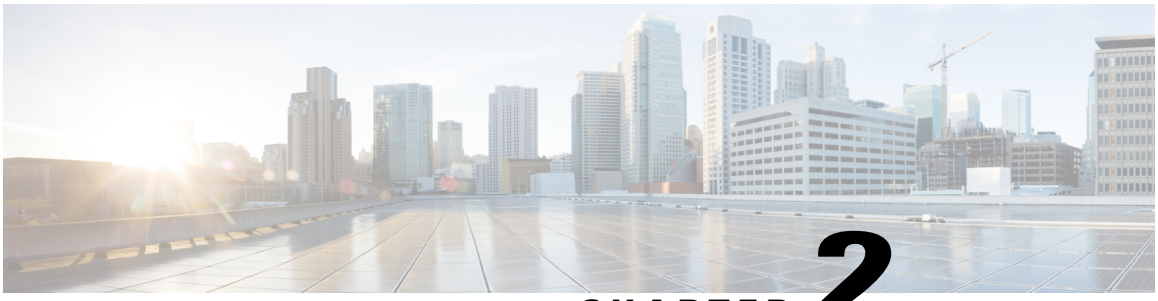
For additional security, you may choose to change the default listening port on the PostgreSQL server. You can configure the default listening port in the postgresql.conf file located in the <install_dir>/data directory.

The default listener port on the Oracle server can be changed by editing the listener.ora config file.

See Default Port Listener Setup for Microsoft SQL Server, for details on how to assign a TCP/IP port number to the SQL Server Database Engine as the default port listener.

Related Topics

Set Up PostgreSQL Listening Port, on page 9



CHAPTER 2

PostgreSQL Installation and Setup

This chapter provides information about installing and setting up PostgreSQL.

- Install PostgreSQL Database, page 7
- Set Up PostgreSQL Listening Port, page 9
- User Access Restriction Recommendations, page 10

Install PostgreSQL Database

Before You Begin

- Cisco recommends that a PostgreSQL DBA install and maintain the PostgreSQL server.
- Read the security recommendations for the PostgreSQL database in section About Security Recommendations, on page 4.

Procedure

Step 1 Enter these commands to sign in to the database server as a Postgres user:

```
>su - postgres
```

```
>psql
```

Step 2 Create a new database user. The example below creates a new database user called *tcuser*:

```
#CREATE ROLE tcuser LOGIN CREATEDB;
```

Note If you deploy PostgresSQL version 8.4.x, you must configure the database user as a superuser at this point in the procedure, for example:

```
#ALTER ROLE tcuser WITH SUPERUSER;
```

Step 3 Create the database. If your database contains ASCII characters only, create the database with SQL_ASCII encoding. If your database contains non-ASCII characters, create the database with UTF8 encoding. The example below creates an SQL_ASCII database called *tcmadb*.

```
#CREATE DATABASE tcmadb WITH OWNER tcuser ENCODING 'SQL_ASCII';
```

Step 4 Configure user access to the database. Edit the *install_dir*/data/pg_hba.conf file to allow the *postgres* user and the new *tcuser* user to access the database. For example:

# TYPE	DATABASE	USER	CIDR-ADDRESS	METHOD
host	tcmadb	tcuser	10.89.99.0/24	password
host	dbinst	mauser	10.89.99.0/24	password
local[1]	all	all		Trust or MD5

[1] **For Unix domain socket connections only.**

Step 5 Enter these commands to define passwords for the *postgres* and *tcuser* users:

```
#ALTER ROLE postgres WITH PASSWORD 'mypassword';

#ALTER ROLE tcuser WITH PASSWORD 'mypassword';
```

Note You are required to enter a password for the database user when you configure an external database entry on the IM and Presence Service.

Step 6 If you are running the PostgreSQL version 8.3.7 or a later 8.3.x release, change the permission of the *tcuser* to superuser to allow this user access to the database. Enter this command:

```
#ALTER ROLE tcuser WITH SUPERUSER;
```

Step 7 Configure the connections to the database from remote hosts. Edit the listen_addresses parameter in the *install_dir*/data/postgresql.conf file. For example:

```
listen_addresses = '*'
```

Step 8 If you are running PostgreSQL version 9.1.1, or higher, you must set the following values in the postgresql.conf file:

```
escape_string_warning = off

standard_conforming_strings = off
```

Step 9 Stop and restart the PostgreSQL service, for example:

```
/etc/rc.d/init.d/postgresql-8.3 stop

/etc/rc.d/init.d/postgresql-8.3 start
```

Note The commands to stop and start the PostgreSQL service may vary between PostgreSQL releases.

Step 10 Enter these commands to sign in to the new database as the *postgres* user and enable PL/pgSQL:

```
>psql tcmadb -U postgres
```

Note The following example, up to the semicolon, should be entered as one line.

```
#CREATE FUNCTION plpgsql_call_handler () RETURNS LANGUAGE_HANDLER AS '$libdir/plpgsql'
LANGUAGE C;

#CREATE TRUSTED PROCEDURAL LANGUAGE plpgsql HANDLER plpgsql_call_handler;
```

Troubleshooting Tips

Do not turn on the following configuration items in the *install_dir*/data/postgresql.conf file (by default these items are commented out):

```
client_min_messages = log
```

```
log_duration = on
```

Related Topics

About Security Recommendations, on page 4

Set Up PostgreSQL Listening Port

Note This section is optional configuration.

By default, the Postgresql database listens on port 5432. If you want to change this port, you must edit the PGPORT environment variable in /etc/rc.d/init.d/postgresql with the new port number.

Note The PGPORT environment variable overrides the 'Port' parameter value in the `/var/lib/pgsql/data/postgresql.conf` file, so you must edit the PGPORT environment variable if you want the Postgresql database to listen on a new port number.

Procedure

Step 1 Edit the PGPORT environment variable in /etc/rc.d/init.d/postgresql with the new port, for example:

```
IE: PGPORT=5555
```

Step 2 Enter these commands to stop and start the PostgreSQL service:

```
# /etc/rc.d/init.d/postgresql start
```

```
# /etc/rc.d/init.d/postgresql stop
```

Step 3 Confirm that the Postgresql database is listening on the new port using this command:

```
'lsof -i -n -P | grep postg'
```

```
postmaste 5754 postgres 4u IPv4 1692351 TCP *:5555 (LISTEN)
```

Tip For IPv6 servers, enter `postmaste 5754 postgres 4u IPv6 1692351 TCP *:5555 (LISTEN)`

Step 4 To connect to the database after you have changed the port, you must specify the new port number in the command using the -p argument. If you do not include the -p argument in the command, the Postgresql database attempts to use the default port of 5432, and the connection to the database fails.
For example:

```
psql tcmadb -p 5555 -U tcuser
```

User Access Restriction Recommendations

We strongly recommend that you restrict user access to the external database to only the particular user and database instance that the IM and Presence Serivce uses. You can restrict user access to the PostgreSQL database in the pg_hba.conf file located in the <install_dir>/data directory.

Caution Do not configure 'all' for the user and database entries because potentially this could allow any user access to any database.

When you configure user access to the external database, we also recommend that you configure password protection for the database access using the 'password' method.

Note You are required to enter a password for the database user when you configure a database entry on IM and Presence Service.

The following are examples of a secure user access configuration, and a less secure user access configuration, in the pg_hba.conf file.

Example of a secure configuration:

# TYPE	DATABASE	USER	CIDR-ADDRESS	METHOD
host	dbinst1	tcuser1	10.89.99.0/24	password
host	dbinst2	mauser1	10.89.99.0/24	password

Example of a less secure configuration:

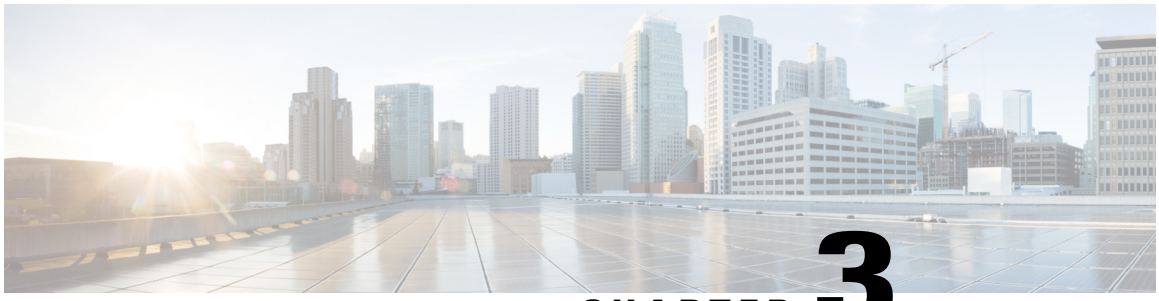
# TYPE	DATABASE	USER	CIDR-ADDRESS	METHOD
host	dbinst1	tcuser1	10.89.99.0/24	trust
host	dbinst2	all	10.89.99.0/24	password

Notes on the example of a less secure configuration:

- The first entry contains no password protection for the database.
- The second entry allows any user to access the database “dbinst2”.

Related Topics

Install PostgreSQL Database, on page 7
PostgreSQL documentation



CHAPTER 3

Oracle Installation and Setup

This chapter provides information about installing and setting up an Oracle database.

- Install Oracle Database, page 11
- Create New Database Instance, page 13

Install Oracle Database

Before You Begin

- Cisco recommends that an Oracle DBA install the Oracle server.
- You need to update the patch for the known Oracle defect: ORA-22275. If this is not done persistent chat rooms will not work properly.
- Read the security recommendations for the Oracle database in your Oracle documentation.
- IM and Presence Service supports Oracle 9i, 10G, and 11G.
- IM and Presence Service supports an SSL connection to Oracle Database Enterprise Edition only.
- To install the Oracle database, refer to your Oracle documentation.

Note In compliance with XMPP specifications, the IM and Presence Service node uses UTF8 character encoding. This allows the node to operate using many languages simultaneously and to display special language characters correctly in the client interface. If you want to use Oracle with the node, you must configure it to support UTF8.

To create tablespace and a database user, connect to the Oracle database as sysdba:

```
sqlplus / as sysdba
```

Procedure

Step 1 Create tablespace.

Note The **DATAFILE** keyword of the **CREATE TABLESPACE** command tells Oracle where to put the tablespace's datafile.

a) Enter the following command:

```
CREATE TABLESPACE tablespace_name DATAFILE
'absolute_path_to_oracle_installation\oradata\database_name\datafile.dbf' SIZE 100M
AUTOEXTEND ON NEXT 1M MAXSIZE UNLIMITED LOGGING EXTENT MANAGEMENT LOCAL SEGMENT SPACE
MANAGEMENT AUTO;
```

- Replace *tablespace_name* with the tablespace name.
- Replace *absolute_path_to_oracle_installation* with the absolute path to where Oracle is installed. The entire path, including *datafile*.dbf, is enclosed in single quotation marks.
- Replace *database_name* with the name of your database folder.
- The *datafile*.dbf must be created in a folder under **\oradata**, in this case the *database_name* folder.
- Replace *datafile*.dbf with the datafile name you want to create.

Step 2 Create a database user.

```
CREATE USER user_name IDENTIFIED BY "new_user's_password" DEFAULT TABLESPACE tablespace_name
TEMPORARY TABLESPACE "TEMP" QUOTA UNLIMITED ON tablespace_name ACCOUNT UNLOCK;
```

- Replace *user_name* with the new user's user name.

  Note The command **CREATE USER user_name** without double quotes will default to upper case and with quotes it will maintain the case

- Replace "*new_user's_password*" with the new user's password.

  Important Enclosing the *new_user's_password* within double quotation marks makes the variable case-sensitive. By default SQL identifiers are not case-sensitive.

- Replace *tablespace_name* with the tablespace name.

Step 3 Grant permissions to the database user.

The following example grants the required permissions and privileges to a database user, which are needed to create or upgrade the schema:

Note Prior to an upgrade, you must ensure that these permissions and privileges are granted, so that all IM and Presence Service services continue to operate as normal following the upgrade.

- `GRANT CREATE SESSION TO user_name;`
- `GRANT CREATE TABLE TO user_name;`
- `GRANT CREATE PROCEDURE TO user_name;`
- `GRANT CREATE TRIGGER TO user_name;`

After you have created or upgraded the schema, the following privileges can be revoked if greater access control is required:

Note Ensure that revoked privileges are granted again before upgrading.

- `REVOKE CREATE TABLE FROM user_name;`
- `REVOKE CREATE PROCEDURE FROM user_name;`

- `REVOKE CREATE TRIGGER FROM user_name;`

Note IM and Presence Service only requires the `CREATE SESSION` privilege for regular operation.

Related Topics

Oracle Documentation

Create New Database Instance

Procedure

Step 1 Enter the command `dbca`
The **Database Configuration Assistant** wizard opens.

Step 2 Click **Next**.
The **Operations** window appears.

Step 3 Click the **Create a Database** radio button and then click **Next**.
The **Database Templates** window appears.

Step 4 Click the **General Purpose or Transaction Processing** radio button and then click **Next**.
The **Database Identification** window appears.

Step 5 Enter a unique Global Database Name on this screen and also a unique Oracle System Identifier (SID) for the database and click **Next**.
Note Take note of the SID because it is needed in Step 15.
The **Management Options** window appears.

Step 6 Under the Enterprise Manager tab the required settings are enabled by default but you can configure optional backups and alert notifications. Click **Next**.
The **Database Credentials** window appears.

Step 7 The window has two options to set up password authentication for database users, choose one and click **Next**.
The **Database File Locations** window appears.

Step 8 The Storage Type drop-down list should be the same as your Oracle Installation. Click the **Use Oracle-Managed Files** radio button and click **Next**.
Note This creates the new database instance in the same folder as your other database instances.
The **Recovery Configuration** window appears.

Step 9 Leave the default values and click **Next**.
The **Database Content** window appears.

Step 10 [Optional] Check the check box if you want to enable Sample Schemas and click **Next**.
The **Initialization Parameters** window appears.

Step 11 Under the Memory tab the default value is for a database instance with 4GB of memory. This can be set higher or lower as needed.
Note The amount of memory used should not be configured too high as this starves other database instances of memory.

Step 12 Under the Character Sets tab click the **Use Unicode** radio button and click **Next**.

The **Database Storage** window appears.

Step 13 Leave the default settings as they are and click **Next**.
The **Create Options** window appears.

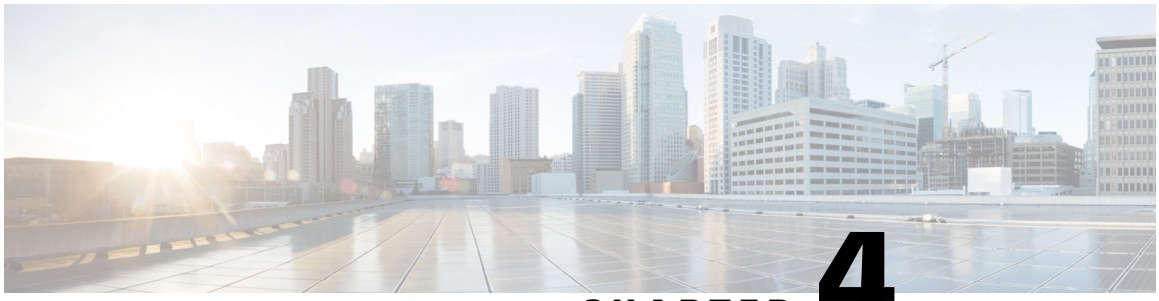
Step 14 Check the Create Database check box and click **Finish**.

Step 15 Once a new database instance is created, you must temporarily change the ORACLE_SID environment variable (from Step 5) on your Unix system by running the command:

```
export ORACLE_SID=new_oracle_db_instance_sid.
```

This will change the SID so when you login using sqlplus, it will use the new instance and not the old one; you can then repeat the steps in Install Oracle Database, on page 11.

Once these steps are completed you can change the ORACLE_SID environment variable by sourcing the bash profile(assuming the old SID is in the bash profile) or by running the export command (Step 15) but changing the SID back to its original value.



CHAPTER 4

Microsoft SQL Installation and Setup

This chapter provides information about installing and setting up Microsoft SQL.

- Install and Setup Microsoft SQL Server, page 15

Install and Setup Microsoft SQL Server

Before You Begin

- Read the security recommendations for the Microsoft SQL database in the About Security Recommendations section.
- Microsoft SQL Server, versions 2012 SP3, 2014, and 2014 SP1 are supported from IM and Presence Service, Release 11.5(1) and are tested.
- To install the MS SQL Server, refer to your Microsoft documentation.

Connect to the MS SQL Server using **Microsoft SQL Server Management Studio**.

Create a New Microsoft SQL Server Database

Use this procedure to create a new Microsoft SQL Server database.

Procedure

Step 1 Enable SQL server and Windows authentication:
a) In the left navigation pane, right-click the name of the Microsoft SQL Server, then click **properties**.
b) Click **Enable SQL Server and Windows Authentication mode**.

Step 2 In the left navigation pane, right-click **Databases** and click **New Database**.

Step 3 Enter an appropriate name in the **Database name** field.

Step 4 Click **OK**. The new name appears in the left navigation pane nested under databases.

Create a new Login and Database User

Use this procedure to create a new login and Microsoft SQL database user.

Procedure

Step 1 In the left navigation pane, right-click **Security** > **Login** and click **New Login**.

Step 2 Enter an appropriate name in the **Login name** field.

Step 3 Check the **SQL Server authentication** check box.

Step 4 Enter a new password in the **Password** field and confirm the password in the **Confirm password** field.

Step 5 Check the **Enforce password policy** check box.

Note Ensure that the **Enforce password expiration policy** is not checked. This password is used by IM and Presence Service to connect to the database and must not expire.

Step 6 Choose the database you want to apply this new user to from the **Default database** drop-down list.

Step 7 In the left navigation pane of the **Login - New** window, click **User Mapping**.

Step 8 Under the **Users mapped to this login** list, check the database to which you want to add this user.

Step 9 Click **User Mapping**, in the **Map** column of the **Users mapped to this pane** pane, check the check box of the database you have already created.

Step 10 In **Server Roles**, ensure that only the **public** role check box is checked.

Step 11 Click **OK**. In **Security** > **Logins**, the new user is created.

Grant Database User Owner Privileges

Use this procedure to grant ownership of a Microsoft SQL database to a database user.

Procedure

Step 1 In the left navigation pane click **Databases**, then click on the name of the database that you have created and click **Security** > **Users**.

Step 2 Right-click on the name of the database user to who you want to add owner privileges, then click **Properties**.

Step 3 In the Database User pane, click **Membership**.

Step 4 In the **Role Members** list, check the **db_owner** check box.

Step 5 Click **OK**.

[Optional] Database User Access Restrictions

Use this procedure if you want to remove the database user as the database owner and apply further optional restrictions to the database user on the Microsoft SQL Server database.

Caution If during an IM and Presence Service upgrade, there is a database schema upgrade, then the database user must have owner privileges for the database.

Before You Begin

Ensure that you carry out the procedures in the IM and Presence Service External Database Setup, on page 19 chapter.

Procedure

Step 1 Create a new database role for executing stored procedures:

a) In the left navigation pane click **Databases**, then click the name of the database to which you want to add new database roles.
b) Right-click **Roles**, and click **New Database Role**.
c) In the **Database Role** window, click **General**.
d) Enter an appropriate name in the **Role name** field.
e) Click **Securables**, then click **Search** to open the **Add Objects** window.
f) Choose the **Specific Objects** radio button, and click **OK**.
g) Click **Object Types** to open the **Select Object Types** window.
h) In the **Select Object Types** window, check the **Stored procedures** check box and click **OK**. Stored procedures is then added to the **Select these object types** pane.
i) Click **Browse**.
j) In the **Browse for Objects** window, check the following check boxes:

- [dbo][jabber_store_presence]
- [dbo][ud_register]
- [dbo][ps_get_affiliation]
- [dbo][tc_add_message_clear_old]
- [dbo][wlc_waitlist_update]

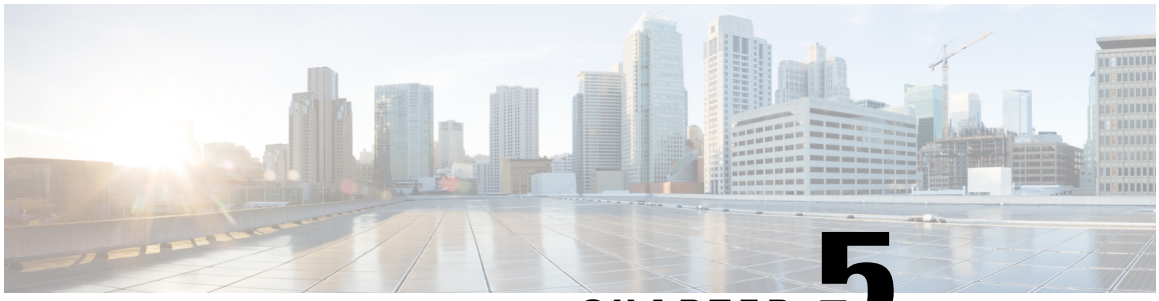
k) Click **OK**. The new names appear in the **Enter the object names to select** pane.
l) On the **Select Objects** window, click **OK**.
m) From the **Database Role** window, click the first entry in the list of objects in the **Securables** list.
n) In the **Explicit** list, check the **Grant** check box for the **Execute** permission.
o) Repeat step 13 and 14 for all objects in the **Securables** list.
p) Click **OK**.
A new database role is created in **Security** > **Roles** > **Database Roles**.

Step 2 To update the database user's database role membership:

a) Under **Security** > **Users**, right-click on the database user you have created, then click **Properties**.
b) In the **Database User** window, click **Membership** in the left navigation pane.
c) In the **Role Members pane**, uncheck the **db_owner** check box.

d) Check the check boxes for **db_datareader**, **db_datawriter**, and the database role which you created in step 1.

Step 3 Click **OK**.



CHAPTER 5

IM and Presence Service External Database Setup

This chapter provides information about the IM and Presence Service external database setup.

- About External Database Assignment, page 19
- Set Up External Database Entry on IM and Presence Service, page 20
- Verify External Database Connection, page 22
- Verify External Database Connection Status on IM and Presence Service, page 23

About External Database Assignment

External Database and Node Assignment

When you configure an external database entry on the IM and Presence Service, you assign the external database to a node, or nodes, in your cluster as follows:

- Message Archiver (compliance) — You require at least one external database per cluster. Depending on your deployment requirements, you can also configure a unique external database per node.
- Persistent Group Chat — You require a unique external database per node. Configure and assign a unique external database for each node in your cluster.
- Managed File Transfer — You require at least one external database per cluster. All of the nodes in a cluster can be assigned to the same database. Depending on your deployment requirements, you can also configure a unique external database per node.
- If you deploy the persistent group chat, message archiver, and managed file transfer features on an IM and Presence Service node, you can assign the same external database to all or any combination of the features.

For more information see:

- Message Archiver — *Instant Messaging Compliance for IM and Presence Service on Cisco Unified Communications Manager*.
- Persistent Group Chat — *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager.*
- Managed File Transfer — *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager*.

Related Topics

Set Up External Database Entry on IM and Presence Service, on page 20
External Database Connection, on page 20

External Database Connection

IM and Presence Service does not establish a connection to the external database when you configure an external database entry. The external database has not created the database schema at this point. It is only when you assign an external database entry to a node that IM and Presence Service establishes an ODBC (Open Database Connectivity) connection with the external database. Once IM and Presence Service establishes a connection, the external database creates the database tables for the IM and Presence Service features.

Once you assign an external database entry to a node, you can validate the connection using the System Troubleshooter in the **Cisco Unified CM IM and Presence Service Administration** user interface.

Related Topics

Set Up External Database Entry on IM and Presence Service, on page 20
Verify External Database Connection Status on IM and Presence Service

Set Up External Database Entry on IM and Presence Service

Perform this configuration on the IM and Presence Service database publisher node of your cluster.

Caution If your IM and Presence Service node connects to an external database server using IPv6, ensure that the enterprise parameter is configured for IPv6 and that Eth0 is set for IPv6 on each node in the deployment; otherwise, the connection to the external database server fails. The Message Archiver and Cisco XCP Text Conference Manager are unable to connect to the external database and fail. For information about configuring IPv6 on IM and Presence Service, see *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager*.

Before You Begin

- Install and configure the external database.
- Obtain the hostname or IP address of the external database.
- If using Oracle, retrieve the tablespace value. To determine the tablespace available for your Oracle database, execute the following query as sysdba:

```
SELECT DEFAULT_TABLESPACE FROM DBA_USERS WHERE USERNAME = 'USER_NAME';
```

Note The user name must be capitalized and in single quotes (a string literal) for this command to succeed, even if you defined the user with lowercase characters.

Procedure

Step 1 Log in to the **Cisco Unified CM IM and Presence Administration** user interface. Choose **Messaging** > **External Server Setup** > **External Databases**.

Step 2 Click **Add New**.

Step 3 Enter the name of the database that you defined at external database installation, for example, tcmadb.

Step 4 Choose the database type from the drop-down list, Postgres, Oracle, or Microsoft SQL Server.

Step 5 If you chose Oracle as the database type, enter the tablespace value.

Step 6 Enter the username for the database user (owner) that you defined at external database installation, for example, tcuser.

Step 7 Enter and confirm the password for the database user, for example, mypassword.

Step 8 Enter the hostname or IP address for the external database.

Step 9 Enter a port number for the external database.
The default port numbers for Postgres (5432), Oracle (1521), Oracle with SSL enabled (2484), and Microsoft SQL Server (1433) are prepopulated in the **Port Number** field. You can choose to enter a different port number if required.

Step 10 If you chose Oracle or Microsoft SQL Server as the Database Type the **Enable SSL** check box becomes active. Check the check box to enable SSL.

Note If you chose Microsoft SQL Server as the Database Type, the **Certificate Name** drop-down list remains inactive because all certificates in the cup-xmpp-trust list are used to verify the certificate sent from the Microsoft SQL Server

If you chose Oracle as the Database Type, the **Certificate Name** drop-down list becomes active. Choose a certificate from the drop-down list.

Note

- When the Enable SSL check box or the Certificate drop-down field is modified, a notification to restart the corresponding service assigned to the external database is sent. A message concerning either Cisco XCP Message Archiver or Cisco XCP Text Conference Manager will be generated.
- The certificate you need to enable SSL must be uploaded to the cup-xmpp-trust store. You must upload this certificate before you enable SSL.
- Once the certificate is uploaded to the cup-xmpp-trust store, you must wait 15 minutes for the certificate to propagate to all the nodes of the IM and Presence Service cluster. If you do not wait, the SSL connection on nodes where the certificate has not propagated fails.
- If the certificate is missing or has been deleted from the cup-xmpp-trust store, an alarm XCPExternalDatabaseCertificateNotFound is raised in the Cisco Unified Communications Manager Real Time Monitoring Tool (RTMT).
  Note No alarm is raised if the external database type chosen is Microsoft SQL Server.
- The following ciphers have been tested with Microsoft SQL Server:
  - TLS_RSA_WITH_AES_128_CBC_SHA256
  - TLS_RSA_WITH_AES_128_CBC_SHA
  - TLS_RSA_WITH_AES_256_CBC_SHA256

Step 11 Click **Save**.

Related Topics

Verify External Database Connection, on page 22

Verify External Database Connection

If you make a configuration change in the *install_dir*/data/pg_hba.conf file or the *install_dir*/data/postgresql.conf file after you assign the external database, perform these steps:

Procedure

Step 1 Unassign and reassign the external database to the IM and Presence Service node.

Step 2 Restart the Cisco XCP Router service. Log in to the **Cisco Unified IM and Presence Serviceability** user interface. Choose **Tools** > **Control Center - Network Services** to restart this service.

Related Topics

PostgreSQL Installation and Setup, on page 7
Oracle Installation and Setup, on page 11
Microsoft SQL Installation and Setup, on page 15

Verify External Database Connection Status on IM and Presence Service

IM and Presence Service provides the following status information on an external database:

- Database reachability — Verifies that the IM and Presence Service can ping an external database.
- Database connectivity — Verifies that the IM and Presence Service has successfully established an Open Database Connectivity (ODBC) connection with the external database.
- Database schema verification — Verifies that the external database schema is valid.

Caution If your IM and Presence Service node connects to an external database server using IPv6, ensure that the enterprise parameter is configured for IPv6 and that Eth0 is set for IPv6 on each node in the deployment; otherwise, the connection to the external database server fails. The message archiver (compliance) and Cisco XCP Text Conference Manager is unable to connect to the external database and fails. For information about configuring IPv6 on IM and Presence Service, see *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager*.

Procedure

Step 1 Log in to the **Cisco Unified CM IM and Presence Administration** user interface. Choose **Messaging** > **External Server Setup** > **External Databases**.

Step 2 Click **Find**.

Step 3 Choose the external database entry that you want to view.

Step 4 Verify that there are check marks beside each of the result entries for the external database in the External Database Status section.

Step 5 In the **Cisco Unified CM IM and Presence Administration** user interface, choose **Diagnostics** > **System Troubleshooter**.

Step 6 Verify that there are check marks beside the status of each of the external database connection entries in the External Database Troubleshooter section.

Troubleshooting Tips

- The IM and Presence Service generates an alarm if it loses ODBC to an external database.
- You can also verify the status of the Postgres database connection using the **psql** command. You must sign in to the Linux shell from a remote support account to run this command; it is not accessible through the administrator CLI. Run the following command after you install the Postgres database, but before you assign the database to an IM and Presence Service node.

Important For `psql` to run, you must first set an environment variable by entering:

```
$export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/xcp/lib
```

Enter:

```
$sudo -u xcpuser /usr/local/xcp/bin/psql -U db_user -h db_server db_name
```

For example:

```
$sudo –u xcpuser /usr/local/xcp/bin/psql –U postgres -h node1 tcmadb
```

- You can verify the status of the Oracle database connection by executing the following commands from the root:

```
export ORACLE_HOME=/usr/lib/oracle/client_1/

export PATH="$ORACLE_HOME/bin:$PATH"

export LD_LIBRARY_PATH="$ORACLE_HOME/lib:$LD_LIBRARY_PATH"

sqlplus username/password@dsn
```

  The *dsn* value can be obtained from the **$ORACLE_HOME/network/admin/tnsnames.ora** file.

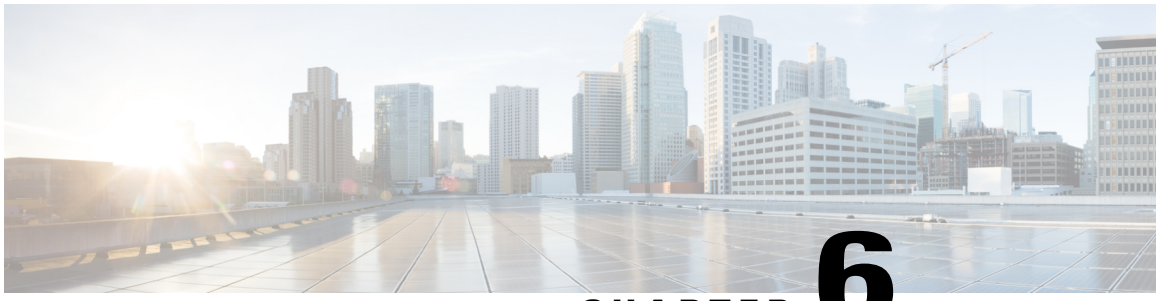
- You can verify the status of the Microsoft SQL database connection by executing the following commands from the root:

```
$sudo -u xcpuser TDSVER=7.3 /usr/local/xcp/bin/tsql -H mssql_server_hostname -p
portnumber -U username -D databasename
```

- If you configure the message archiver (compliance) feature, and the Cisco XCP Message Archiver service fails to start, or you configure the persistent group chat feature and the Cisco Text Conference Manager service fails to start, check the External Database Troubleshooter section of the **System Configuration Troubleshooter** window.
  - If it shows that the status of the external database connection is not **OK**, verify that you provided the correct connection details and that there are no network issues between the IM and Presence Service node and the external database host.
  - If the status of the external database connection is **OK**, but the schema verification status is not, unassign the external database from the node, and reassign it again.

- Once the certificate is uploaded to the cup-xmpp-trust store, you must wait 15 minutes for the certificate to propagate to all the nodes of the IM and Presence Service cluster. If you do not wait, the SSL connection on nodes where the certificate has not propagated fails.
- If the certificate is missing or has been deleted from the cup-xmpp-trust store, an alarm 'XCPExternalDatabaseCertificateNotFound' is raised in the Cisco Unified Communications Manager Real Time Monitoring Tool (RTMT).

Note No alarm is raised if the external database type chosen is Microsoft SQL Server.



CHAPTER 6

External Database Tables

This chapter provides information about the external database tables that are created in your schema to support the IM and Presence Service node.

Note By default, the IM and Presence Service generates 27 tables in the external database but at present it only uses the tables described in this module.

Note If you need to modify any data in the external database, ensure that you restart the Cisco XCP Text Conference Manager service after you have made those changes.

- AFT_LOG Table, page 25
- TC_ROOMS Table, page 29
- TC_USERS Table, page 29
- TC_MESSAGES Table, page 30
- TC_TIMELOG Table, page 31
- TC_MSGARCHIVE Table, page 31
- JM Table, page 32

AFT_LOG Table

The AFT_LOG table, contains information about file transfers that occur when using the Cisco Unified Communications Manager IM and Presence Service managed file transfer feature.

Indexes: "aft_log_pkey" PRIMARY KEY, btree (aft_index)

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
AFT_INDEX	BIGINT	NUMBER (19)	bigint	Yes	The sequence number that identifies the transaction.
JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The Jabber ID (JID) of the user who uploaded or downloaded a file. The contents of this column depend on the contents of the METHOD column. • When the METHOD column contains "POST," this is the JID of the user who uploaded the file. • When the METHOD column contains "GET," this is the JID of the user who downloaded the file.
TO_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The JID of the user, group chat, or persistent room that is the intended recipient of the file transfer.
METHOD	VARCHAR (63)	VARCHAR2 (63)	varchar (63)	Yes	This column can contain either POST, which indicates a user has uploaded a file, or GET, which indicates a user has downloaded a file.
FILENAME	VARCHAR (511)	VARCHAR2 (511)	varchar (511)	Yes	The resource name for the file that was uploaded or downloaded. The resource name identifies the file in HTTP requests. It is autogenerated by the IM and Presence Service.
REAL_FILENAME	VARCHAR (511)	VARCHAR2 (511)	varchar (511)	Yes	The actual name of the file that was uploaded by a user.
FILE_TYPE	VARCHAR (10)	VARCHAR2 (10)	varchar (10)	Yes	The file extension, for example jpg, txt, pptx, docx, and so on.
CHAT_TYPE	VARCHAR (10)	VARCHAR2 (10)	varchar (10)	Yes	"im" if the file was transferred during a one-to-one IM conversation. "groupchat" if the file was transferred during an ad hoc group chat conversation. "persistent" if the file was transferred to a persistent chat room.
FILE_SERVER	VARCHAR (511)	VARCHAR2 (511)	varchar (511)	Yes	The hostname or IP address of the file server where the file is stored.
FILE_PATH	VARCHAR (511)	VARCHAR2 (511)	varchar (511)	Yes	The absolute path to the file (including the file name) on the file server. The file name as stored on the repository is unique and is auto-generated by the IM and Presence Service.
FILESIZE	BIGINT	NUMBER (19)	bigint	Yes	The size of the file in bytes.
BYTES_TRANSFERRED	BIGINT	NUMBER (19)	bigint	Yes	The number of bytes that were transferred. This number differs from FILESIZE, only when an error occurred during the transfer.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
TIMESTAMPVALUE	TIMESTAMP	TIMESTAMP	timestamp	Yes	The date and time (UTC) the file was uploaded or downloaded.

Sample SQL Queries for the AFT_LOG Table

This section contains some sample SQL queries that you can run on the AFT_LOG table to extract specific information.

All Uploaded Files

The following SQL query returns records of all the files and screen captures that were uploaded using the manged file transfer feature:

```
SELECT file_path

FROM aft_log

WHERE method = 'Post';
```

All Files That Were Uploaded to a Specific Recipient

The following SQL query returns the records of all the files and screen captures that were uploaded to the user <userid> using the managed file transfer feature.

Note Records of downloaded files and screen captures do not contain any data in the *to_jid* field.

```
SELECT file_path

FROM aft_log

WHERE to_jid = '<userid>@<domain>';
```

All Files That Were Uploaded by a Specific Sender

The following SQL query returns the records of all the files and screen captures that were uploaded by the user <userid> using the managed file transfer feature.

```
SELECT file_path

FROM aft_log

WHERE jid  LIKE '<userid>@<domain>%' AND method = 'Post';
```

All Files That Were Downloaded by a Specific User

The following SQL query returns the records of all the files and screen captures that were downloaded by the user <userid> using the manged file transfer feature.

```
SELECT file_path
FROM aft_log
WHERE jid  LIKE '<userid>@<domain>%' AND method = 'Get';
```

All Files That Were Uploaded and Downloaded During IM Conversations

The following SQL query returns the records of all the files and screen captures that were uploaded and downloaded in IM conversations using the managed file transfer feature.

```
SELECT file_path
FROM aft_log
WHERE chat_type = 'im';
```

All Files That Were Uploaded by a Specific User After a Specific Time

The following SQL query returns the records of all the files and screen captures that were uploaded by the user <userid> after a specific time using the managed file transfer feature.

```
SELECT file_path
FROM aft_log
WHERE jid  LIKE '<userid>@<domain>%' AND method = 'Post' AND timestampvalue > '2014-12-18
11:58:39';
```

Sample Output for SQL Queries for the AFT_LOG Table

Sample output from any of these queries looks like this:

```
/opt/mftFileStore/node_1/files/im/20140811/15/file_name1
/opt/mftFileStore/node_1/files/im/20140811/15/file_name2
/opt/mftFileStore/node_1/files/im/20140811/15/file_name3
/opt/mftFileStore/node_1/files/im/20140811/15/file_name4
...
/opt/mftFileStore/node_1/files/im/20140811/15/file_name99
/opt/mftFileStore/node_1/files/im/20140811/15/file_name100
```

Using the Output to Clean Up the External File Server

You can use this output with the **rm** command to remove unwanted files from the external file server. For example, you can run the following commands on the external file server:

```
rm /opt/mftFileStore/node_1/files/im/20140811/15/file_name1
```

rm `/opt/mftFileStore/node_1/files/im/20140811/15/file_name2`

rm `/opt/mftFileStore/node_1/files/im/20140811/15/file_name3`

and so on.

TC_ROOMS Table

The TC_ROOMS table contains information for group chat rooms.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
ROOM_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The ID of the room.
CREATOR_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The ID of the user who created the room.
SUBJECT	VARCHAR (255)	VARCHAR2 (255)	varchar (255)	Yes	The current subject for the room.
TYPE	VARCHAR (32)	VARCHAR2 (32)	varchar (32)	Yes	The constraint check_type. This value must be either “ad-hoc” or “persistent”.
CONFIG	TEXT	CLOB	text	Yes	The entire packet from the last time the room was configured. This information enables the room to be reconfigured when the room is recreated (for example, at start-up).
SPACKET	TEXT	CLOB	text	Yes	The entire packet from the last time the subject was set for the room. This information enables the room subject to be displayed when the room is recreated.
START_MSG_ID	BIGINT	NUMBER (19)	bigint	Yes	A sequence number that is used to populate the MSG_ID column in the TC_MSGARCHIVE table. Do not modify this value.
NEXT_MSG_ID	BIGINT	NUMBER (19)	bigint	Yes	A sequence number that is used to populate the MSG_ID column in the TC_MSGARCHIVE table. Do not modify this value.

TC_USERS Table

The TC_USERS table contains roles and affiliations, alternate names, and other data associated with group chat room users.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
ROOM_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The ID of the room.
REAL_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar (3071)	Yes	The ID of a user in the room. This value is the actual ID of the user, rather than an alternate name.
ROLE	VARCHAR (32)	VARCHAR2 (32)	varchar (32)	Yes	The role of the user in the room. This value is constrained to one of the following: “none”, “hidden”, “visitor”, “participant”, or “moderator”.
AFFILIATION	VARCHAR (32)	VARCHAR2 (32)	varchar (32)	Yes	The affiliation of the user in the room. This value is constrained to one of the following: “none”, “outcast”, “member”, “admin”, or “owner”.
NICK_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the room, plus the alternate name for the user. The format is room@tc-server/nick.
REASON	VARCHAR (255)	VARCHAR2 (255)	varchar(255)	Yes	The reason entered when the user's affiliation was last changed.
INITIATOR_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the room in which the configuration change occurred.

TC_MESSAGES Table

The TC_MESSAGES table contains messages that are sent in group chat rooms.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
MSG_ID	BIGINT	NUMBER (19)	bigint	Yes	The ID of the message. The MSG_ID is a unique identifier for each message per chat room; it is not globally unique.
ROOM_JID	VARCHAR (3071)	VARCHAR (3071)	varchar(3071)	Yes	The ID of the room to which the message was sent.
STAMP	TIMESTAMP	TIMESTAMP	datetime	Yes	The date and time the message was sent.
MSG	TEXT	CLOB	text	Yes	The entire message.

TC_TIMELOG Table

The TC_TIMELOG table contains the time that users enter and exit specific group chat rooms. This table may be used in conjunction with the other TC tables to recreate group chat conversations and to determine which users viewed the conversations.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
REAL_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the user who is entering or leaving the room.
NICK_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the room, plus the alternate name for the user. The format is room@tc-server/nick.
DIRECTION	VARCHAR (1)	VARCHAR2 (1)	varchar(1)	Yes	Indicates whether the user entered (E) or left (L) the room. Constrained to the values “E” and “L”.
STAMP	TIMESTAMP	TIMESTAMP	datetime	Yes	The date and time at which the user entered or left the room.

TC_MSGARCHIVE Table

The TC_MSGARCHIVE table stores messages and associated information for group chat rooms.

Note This table archives all messages if you turn on group chat on IM and Presence Service. Choose the option Archive all room messages on the **Cisco Unified CM IM and Presence Administration** user interface. Choose **Messaging** > **Conferencing and Persistent Chat**. See *Configuration and Administration of IM and Presence Service on Cisco Unified Communications Manager* for information on the group chat feature.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
MSG_ID	BIGINT	NUMBER (19)	bigint	Yes	A unique identifier for the message.
TO_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the room that received the message.
FROM_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the user who sent the message.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL Datatype	Not Null	Description
NICK_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The ID of the room, plus the alternate name of the sender; for example: room@conference.exmpl.com/nick
SENT_DATE	TIMESTAMP	TIMESTAMP	datetime	Yes	The date on which the message was sent.
MSG_TYPE	VARCHAR (1)	VARCHAR2 (1)	varchar(1)	Yes	The first character of the type attribute of the message. The possible values are “c” (chat), “n” (normal), “g” (groupchat), “h” (headline), and “e” (error).
BODY_LEN	INT	NUMBER (9)	int	Yes	The length in characters of the message body.
MESSAGE_LEN	INT	NUMBER (9)	int	Yes	The length in characters of the message, including the subject and body.
BODY_STRING	VARCHAR (4000)	VARCHAR2 (4000)	varchar(4000)	Yes	The message body.
MESSAGE_ STRING	VARCHAR (4000)	VARCHAR2 (4000)	varchar(4000)	Yes	The entire raw packet.
BODY_TEXT	TEXT	CLOB	text	Yes	If the message body exceeds 4000 characters, it is stored in this field rather than the BODY_STRING field.
MESSAGE_TEXT	TEXT	CLOB	text	Yes	If the entire raw packet exceeds 4000 characters, it is stored in this column rather than in the MESSAGE_STRING column.
SUBJECT	VARCHAR (255)	VARCHAR2 (255)	varchar(255)	Yes	The current subject of the room.

JM Table

The JM table stores conversations and associated information for the message archiver component. The message archiver component provides the native compliance functionality on the IM and Presence Service.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL datatype	Not Null	Description
TO_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The Jabber ID (JID) of the user who is sending the message being archived.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL datatype	Not Null	Description
FROM_JID	VARCHAR (3071)	VARCHAR2 (3071)	varchar(3071)	Yes	The JID of the user who is receiving the message being archived.
SENT_DATE	TIMESTAMP	TIMESTAMP	datetime	Yes	The date the message was sent.
SUBJECT	VARCHAR (128)	VARCHAR2 (128)	varchar(128)	Yes	The subject line of the message that is being archived.
THREAD_ID	VARCHAR (128)	VARCHAR2 (128)	varchar(128)	Yes	The thread ID of the message that is being archived.
MSG_TYPE	VARCHAR (1)	VARCHAR2 (1)	varchar(1)	Yes	The first character of the message's type attribute. The possible values are: • “c” — chat • “n” — normal • “g” — groupchat • “h” — headline • “e” — error
DIRECTION	VARCHAR (1)	VARCHAR2 (1)	varchar(1)	Yes	Indicates whether the message is “O” — outgoing or “I” — incoming. If the message is sent between users on the same server, it is logged twice: once as outgoing and once as incoming.
BODY_LEN	INT	NUMBER (9)	int	Yes	The number of characters in the message body.
MESSAGE_LEN	INT	NUMBER (9)	int	Yes	The number of characters in the message, including the subject and the body.
BODY_STRING	VARCHAR (4000)	VARCHAR2 (4000)	varchar(4000)	Yes	The message body.
MESSAGE_ STRING	VARCHAR (4000)	VARCHAR2 (4000)	varchar(4000)	Yes	The entire raw packet.
BODY_TEXT	TEXT	CLOB	text	Yes	If the message body exceeds 4000 characters, it is stored in this field rather than the BODY_STRING field.

Column Name	Postgres Datatype	Oracle Datatype	Microsoft SQL datatype	Not Null	Description
MESSAGE_TEXT	TEXT	TEXT	text	Yes	If the entire raw packet exceeds 4000 characters, it is stored in this field rather than in the MESSAGE_STRING field.
HISTORY_FLAG	VARCHAR (1)	VARCHAR2 (1)	varchar(1)	Yes	Used when room history messages are sent to new participants (upon entering an existing room). This allows you to distinguish between messages received while actively participating in a room and those received as part of a history push. The latter message type is flagged with HISTORY_FLAG="H" in the database. Otherwise, this column is set to "N."

Sample SQL Queries for the JM Table

This section contains some sample SQL queries that you can run on the JM table to extract specific information. The following queries select all columns from the table but you can be more selective about which information you want to include in your SQL queries.

All Instant Messages Sent by a Specific User

The following SQL query returns all instant messages sent by a specific user:

```
SELECT to_jid, sent_date, subject, thread_id, msg_type, direction, body_len, message_len,
body_string, message_string, body_text, message_text, history_flag
FROM jm
WHERE from_jid like 'bob@cisco.com%';
```

All Instant Messages Received by a Specific User

The following SQL query returns all instant messages received by a specific user:

```
SELECT from_jid, sent_date, subject, thread_id, msg_type, direction, body_len,
message_len, body_string, message_string, body_text, message_text, history_flag
FROM jm
WHERE to_jid like 'bob@cisco.com%';
```

All Instant Messages That Contain a Specific Word

The following SQL query returns all instant messages that contain a specific word:

```
SELECT to_jid, from_jid, sent_date, subject, thread_id, msg_type, direction, body_len,
message_len, body_string, message_string, body_text, message_text, history_flag
FROM jm
WHERE LOWER(body_string) like LOWER('%hello%');
```

All Instant Messages Conversations and Chat Rooms From a Specific Date

The following SQL query returns all instant messages, conversations and chat rooms from a specific date:

```
SELECT to_jid, from_jid, sent_date, subject, thread_id, msg_type, direction, body_len,
message_len, body_string, message_string, body_text, message_text, history_flag
FROM jm
WHERE CAST(sent_date AS Character(32)) like '2011-01-31%';
```